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NATIONAL CENTER FOR ATMOSPHERIC RESEARCH
BOULDER, COLORADO

TO: W. H. Pennington DATE: 5/ 1/78
FROM: Ed Martell

Dear Herb:

Here is an advanced copy of my testimony for the Rocky Flats Hearings on May 2nd. a short-summary-statement and two attachments. My oral statement will touch on the main points, particularly in the first attachment.

Will see you at the Hearings.

Best regards,

Ed Martell

Enclosures: Statement, with two attachments.

1/4

24 May 1978

TO: United States Department of Energy

FROM: Dr. Edward A. Martell, National Center for Atmospheric Research,* Boulder, Colorado 80307

SUBJECT: Critique of ERDA-1545-D and DOE Staff Statement of April 1978 with respect to health effects and standards for exposure to alpha emitting pollutants+

The stated purpose of these hearings is to afford further opportunity for public comment regarding the draft Environmental Impact Statement on Rocky Flats, with particular attention to the nine substantive points addressed in the DOE Staff Statement dated April 1978. My comments apply specifically to point (2), health effects of the operation of the plant and the method of calculating the dose of radiation to the population, and to point (5), environmental monitoring, analysis and standards.

The principal public health risks associated with the Rocky Flats Plant operation are the cancer risks and genetic effects attributable to plutonium, americium and other alpha emitting contaminants. And a question of particular concern is that of the health risks associated with high plutonium and americium contamination of soils and vegetation in the offsite environs of Rocky Flats. In some areas the plutonium contamination from Rocky Flats exceeds fallout levels of plutonium in the surface layers of soils by factors of hundreds to thousands.

Despite assurances to the contrary in ERDA-1545-D and in the DOE Staff Statement, there is no adequate basis for the assessment of cancer risks and genetic effects for persons chronically exposed to alpha emitting contaminants in soils. Estimates of cancer risks and genetic effects given in ERDA-1545-D

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+Statement presented at hearings on the draft Environment Impact Statement, ERDA-1545-D, Rocky Flats Plant Site, Golden, Colorado, sponsored by the Department of Energy and held on 24 May 1978 in Denver, Colorado.

are made on essentially the same basis as those given in the recent report of the U.S. Environmental Protection Agency report "Proposed Guidance on Dose Limits for Persons Exposed to Transuranium Elements in the General Environment," EPA 520/4-77-016, September 1977. My comments on the EPA Proposed Guidance, dated 24 February 1978, are equally applicable to ERDA-1545-D and are appended herewith as the main part of my statement.

The risk estimates in both ERDA-1545-D and the EPA Proposed Guidance are based substantially on the National Academy of Sciences BEIR Committee Reports of 1972 and 1976. I must point out that these BEIR Committee reports have very serious shortcomings with respect to their treatment of internal alpha emitters in man and their genetic effects, cancer risks and other chronic health effects. These shortcomings are described explicitly in Section 6, pages 7 and 8 of my appended comments on the EPA Guidance and in the accompanying statement to the BEIR Committee, "Bronchial Cancer in Cigarette Smokers from Alpha Emitting "Warm Particles," July 22, 1977.

In all risk assessments by ERDA, EPA and the BEIR Committee, it is tacitly assumed that most genetic effects and most cancers in man are attributable to agents (unidentified) and/or mechanisms other than ionizing radiation. The validity of this supposition is central to the issue of genetic effects and cancer risks of alpha emitters. There is published evidence indicating that alpha emitters may be concentrated at germ cell sites and at tumor sites in mammals, including man. Alpha emitters are exceptionally effective in the production of gross chromosome aberrations which are observed in most human malignancies and genetic disorders. By comparison the proposed chemical mutagens and carcinogens are incapable of inducing such aberrations. In addition, the age distribution of cancer in man and other lines of evidence indicate that the induction of cancer is a multi-stage process. On this basis, insoluble alpha emitting "warm particles" which can accumulate and persist at tumor sites and which give rise to only about one alpha hit per cell per day would be very effective agents of cancer induction. For these reasons (and for other considerations discussed in the enclosures) very small burdens of insoluble alpha particles at the sites of human tumors which typically exhibit malignant cells with gross chromosome aberrations should be the prime candidate as the carcinogenic agent or essential cocarcinogen.

The microdistribution of natural and pollutant alpha emitters at the germ cells and tumor sites in mammals and in man can be and should be determined experimentally. Thereafter the implications of the observed distributions can be assessed in terms of all reasonable cancer models based on known alpha and other high-LET radiation interaction effects and cellular responses to such effects. Past and present practices of assessing health effects of alpha emitters based on the organ burdens and the average alpha dose is, at best,

only a crude and empirical approach. Until the essential research is carried out, all estimates of genetic effects and cancer risks attributable to alpha emitting pollutants will involve serious uncertainties and, for reasons set forth in this statement and attachments, may very greatly underestimate the consequences. Now that large numbers of people in the western suburbs of Denver and elsewhere are being exposed to such risks, serious experimental and epidemiological studies are urgently needed. Risk estimates and exposure standards based on inadequate evidence and questionable assumptions no longer will do.

The following two items are appended to this brief statement to provide further discussion of the specific issues addressed above and references to the pertinent publications.

1. E. A. Martell to U.S. Environmental Protection Agency, "Comments on 'Proposed Guidance on Dose Limits for Persons Exposed to Transuranium Elements in the Environment,' Report of the U.S. Environmental Protection Agency, September 1977," 24 February 1978.

2. E. A. Martell, July 22, 1977 statement to National Academy of Sciences. BEIR Committee, "Bronchial Cancer in Cigarette Smokers from Alpha Emitting 'Warm Particles.'"